



ZIMBABWE

**MINISTRY OF HIGHER AND TERTIARY EDUCATION,
INNOVATION, SCIENCE AND TECHNOLOGY
DEVELOPMENT**

**HIGHER EDUCATION EXAMINATIONS COUNCIL
(HEXCO)**

NATIONAL CERTIFICATE

IN

MACHINESHOP ENGINEERING

MODULE: Machine Operations for PAPER NO: 340/22/M05/1
Machinshop Engineering Workshop
Equipment 1

DURATION: 3 Hours

MAY/JUNE 2024 EXAMINATION

REQUIREMENTS

1. Answer booklet.
2. BS 4500 Data sheet
3. Non programmable scientific calculator.

INSTRUCTIONS TO CANDIDATE

1. Section A – Answer all questions (20 marks).
2. Section B- Answer all questions (20 marks).
3. Section C – Answer four (4) questions in this Section.
Each question carries (15) marks – (60 marks).

SECTION A: Compulsory

QUESTION 1

- 1.1 The other name for white metal is _____ (1 mark)
- 1.2 H.C.S stands for _____ with regards cutting tool materials. (1 mark)
- 1.3 The Accuracy of an imperial Micrometer is _____ (1 mark)
- 1.4 A chisel used to correct the start of a wrongly drilled hole is _____ (1 mark)
- 1.5 A file with a safe edge is called a _____ file. (1 mark)
- 1.6 Another name for an odd-leg caliper is _____ (1 mark)
- 1.7 One example of a thermosetting plastic is _____ (1 mark)
- 1.8 Another name for dot punch is _____ (1 mark)
- 1.9 A thread is given as M12× 1.75. State the meaning of 1.75 (1 mark)
- 1.10 Give the point angle of a centre punch. (1 mark)
- 1.11 Explain the term “pitch” with regards to hacksaw blades. (1 mark)
- 1.12 Give one (1) material used to make hacksaw blades. (1 mark)
- 1.13 A file with a square section is called a _____ file. (1 mark)
- 1.14 Define Brittleness. (1 mark)
- 1.15 For drawing line perpendicular to an edge we use _____ (1 mark)
- 1.16 A solid die is used for _____ (1 mark)
- 1.17 State the file used for filing concave curves. (1 mark)
- 1.18 The metallic ring found on the file handle is called a _____ (1 mark)
- 1.19 Apart from a file card, which other tool is used to unclog file teeth. (1 mark)
- 1.20 Babbitt is an alloy of lead and _____ (1 mark)

SECTION B: Compulsory

QUESTION 2

- 2.1 Give any two (2) types of cold chisels. (2 marks)
- 2.2 Explain the term 'grade of file' (2 marks)
- 2.3 Calculate the Tap drill size (TDS) for an M16×2mm pitch thread. (2 marks)
- 2.4 A thread is given as M6×1 state the meaning for what the following codes stand for
- i) M _____ (1 mark)
- ii) 6 _____ (1 mark)
- 2.5 State the angle for the following tools
- i) Flat chisel (1 mark)
- ii) Drill bit general purpose. (1 mark)
- 2.6 Define heat treatment. (2 marks)
- 2.7 Give two (2) reasons why reamers have a left hand helix. (2 marks)
- 2.8 Give two (2) non-ferrous metals. (2 marks)
- 2.9 Define the term Datum. (2 marks)
- 2.10 Bronze is an alloy of ____ and ____ (2 marks)

SECTION C: Answer any four (4) questions

QUESTION 3

- a) Draw a fully labelled diagram of a ball pein hammer. (6 marks)
- b) i) Hammers are classified by two main aspects, state them. (2 marks)
- ii) The pein of a cross pein hammer is used for ____ (1 mark)
- c) i) List any four (4) types of cuts with regards to files. (4 marks)
- ii) Differentiate between cross filing and draw filing. (2 marks)

QUESTION 4

- a) List any five (5) advantages of Granite marking out table over cast iron marking out table. (5 marks)
- b) Draw a fully labelled diagram of a vernier caliper. (8 marks)
- c) Identify any two (2) types of scrapers. (2 marks)

QUESTION 5

- a)
 - i) Give three (3) reasons why drilled holes should be reamed. (3 marks)
 - ii) State three (3) purposes of drill bit flutes. (3 marks)
- b) Explain fully how the accuracy of a metric micrometer is obtained. (6 marks)
- c) Give the accuracy of the following measuring instruments:
 - i) Tape measure (1 mark)
 - ii) Steel rule (1 mark)
 - iii) Vernier protractor (1 mark)

QUESTION 6

- a) Explain fully the accuracy of a calliper with the aid of calculation. (6 marks)
- b) A set of taps has three (3) taps, state these. (3 marks)
- c)
 - i) List any three (3) types of granite rocks used to make marking out tables. (3 marks)
 - iii) State any two (2) tools used to mark arcs and circles in the workshops. (2 marks)
 - iv) State the main advantage of vernier caliper over digital caliper (1 mark)

QUESTION 7

- a) With the aid of a neatly labelled diagram, show the behaviour of a 0,83°C plain carbon steel when heated to the critical range and allowed to cool slowly in the furnace. (8 marks)
- b) Explain the following heat treatment terms:
- i) Pearlite
 - ii) Ferrite
 - iii) Cementite
 - iv) Austentite (4 marks)
- c) State three (3) aspects by which files are specified. (3 marks)

QUESTION 8

- a) With regards to limits and fits explain the following terms:
- i) Hole basis system. (2 marks)
 - ii) Shaft basis system. (2 marks)
- b) A loose running fit on a bearing is given as 45 H9d10.
Calculate:
- i) Tolerance on bearing (4 marks)
 - ii) Tolerance on shaft (4 marks)
- c) List any three (3) materials used for making soft hammers. (3 marks)

BRITISH STANDARD
SELECTED ISO FITS—HOLE BASIS

Extracted
from
MS-45001: 1969

[illegible]

British Standard data sheet BS 4500A; selected ISO fits – hole basis